

NovoBPT User's Manual

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1. Introduction

Software :  **NovoBPT**

First Release : January 2013

Licensing Model : [License File](#)

Production Team : [Alireza Afkhami](#) (M.A.Sc, M.C.P, P.Eng)

Updates : [click to open](#)

Disclaimer : [click to read](#)(See 3.)

NovoBPT is a computer program designed for correcting and correlating Becker hammer penetration test blow counts to Standard Penetration Test (N_{60}) blow counts. Please keep your software up-to-date by visiting the program's [web page](#).

Although all efforts have been undertaken to ensure that this software is of the highest possible quality and that the results obtained are correct, the authors do not warrant the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error-free. The authors are not responsible and assume no liability for any results or any use made thereof, nor for any damages or litigation that may result from the use of the software for any purpose. All results to be verified independently by user.



2. References

- 1- Energy Measurements and Correlations of the Standard Penetration Test (SPT) and the Becker Penetration Test (BPT), 1993, Alexander Sy, R.G. Campanella (UBC)
- 2- Becker and Standard Penetration Tests (BPT-SPT) Correlations with Consideration of Casing Friction, Canadian Geotechnical Journal 1994, Alexander Sy, R.G. Campanella (UBC)
- 3- BPT-SPT Correlations for Evaluation of Liquefaction Resistance in Gravelly Soils, ASCE National Convention 1995, Alexander Sy, R.G. Campanella, R.A. Stewart

3. License Agreement

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2. "Trial Version" means a free version of the Software for personal use only, so identified, to be used in one computer only and for a period of 14 days. The Trial Version is fully functional with no restrictions compared to the registered version.
3. "Registered Version" means a version which has been bought to “Novo Tech Software”.

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4. Contents

4.1 Getting Started ...

When starting a new analysis with NovoBPT, the following steps are recommended:

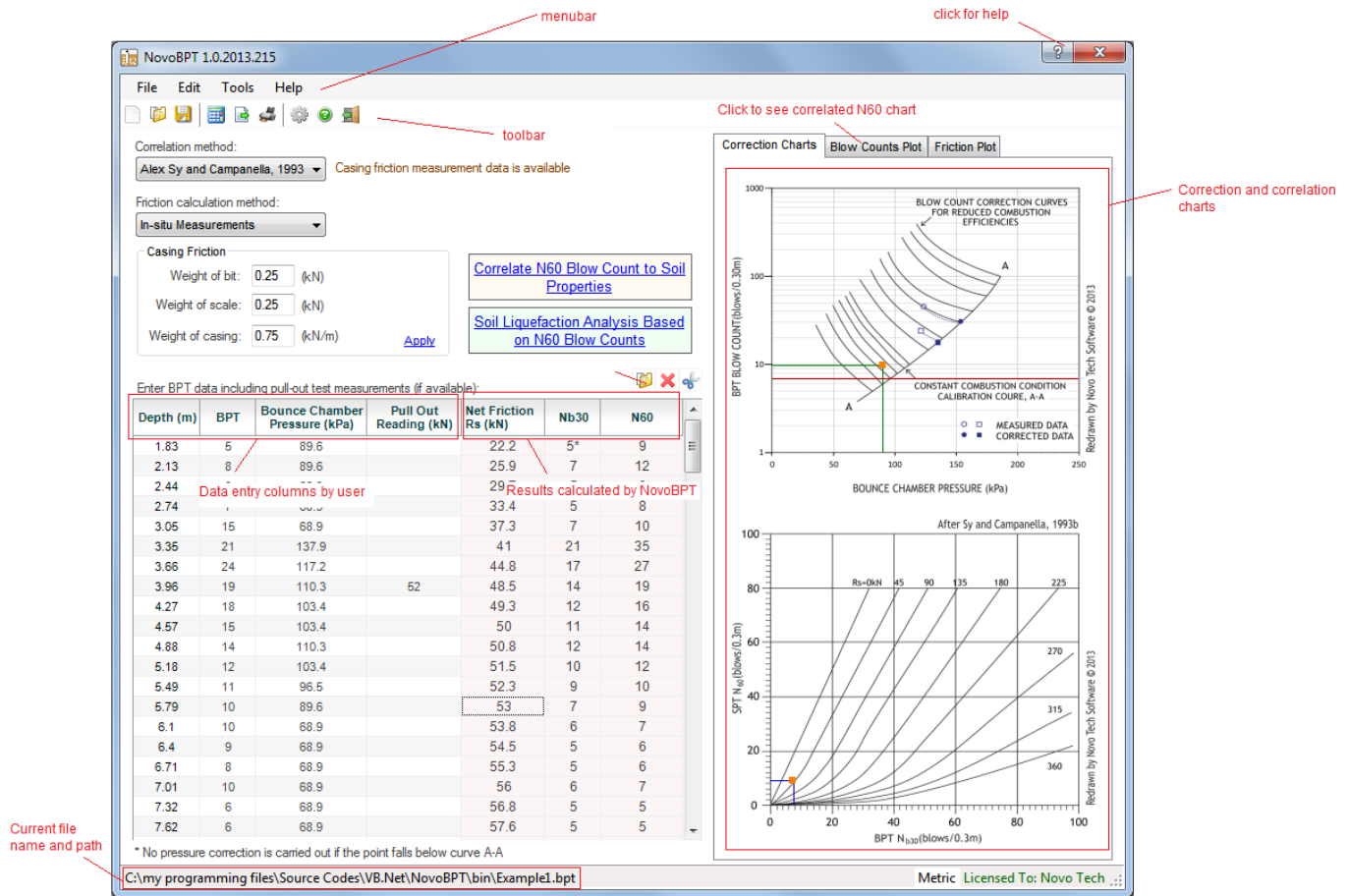
Step 1: Choose correlation method and casing friction settings. If friction data is available, enter weight of casing, etc.

Step 2: Enter BPT blow counts in the table or [import](#) (See 4.5.3) data from text file.

Step 3: As you enter data, friction along the casing and pressure corrected BPT blow counts are calculated and shown on the table.

Step 4: Check the graphs for variation of results with depth of the testhole.

Step 5: [Print](#) (See 4.8.4) or [export](#) (See 4.8.3) the results as needed.



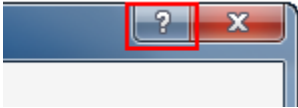
please note that:

- by [clicking on any chart](#) (See 4.6) you will have access to several options for printing and exporting the chart.
- ? sign at the [top-right corner](#) (See 4.2) of each page, opens up the corresponding help page.
- analysis files are saved with .BPT extension and the complete file path is shown at the bottom of the page.

- if an update of the software is available, a red link will be shown on the top-right corner of the page. Click on the link to open the webpage.

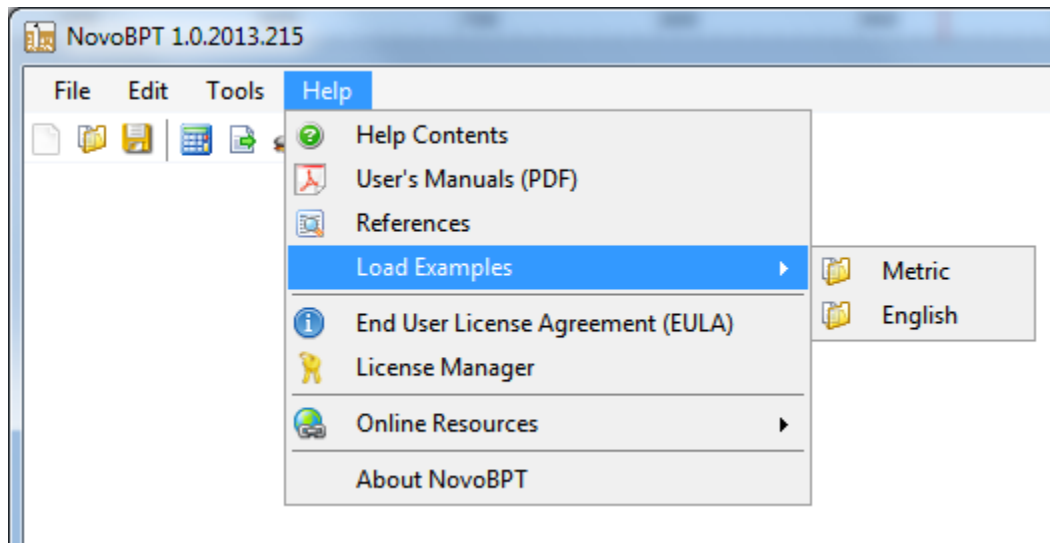
4.2 Activating Help

Help button is placed at the top-right corner of all pages, as shown on this screenshot. In order to load the help content associated with the page please click on the question mark button.



4.3 Loading Example Projects

NovoBPT comes with two example file in Metric and English unit systems. In order to load the example projects choose **File** ► **Load Examples** menu and select your desired units system from the submenus.



4.4 How to Change Units System

NovoBPT supports both Metric and Imperial units. To switch between units system, please use **Tools** ► **Options** menu. You should restart the program for the new units system to take effect.

4.5 Data Entry

4.5.1 Starting a New Project

In order to start a new project, choose **File** ► **New** menu or click on New icon on the top toolbar.

4.5.2 How to Input Data

In order to enter data required for Becker penetration test processing, you need to enter the following sections:

Methods

Correlation Method: Choose from the following methods from the following list:

- Alex Sy and Campanella, 1993b (takes casing friction in to account)
- Harder and Seed, 1986 (does not take casing friction in to account)

See [references](#)(See 2.) for detailed description of each method.

Casing Friction: The following options are available:

- In-situ Measurements: You need to enter casing friction measurements. NovoBPT will apply linear interpolation between readings. If this options is selected, user must enter weight of drill bit and weight of casing per unit length.
- No Friction: This option is only applicable to Harder and Seed, 1986method.
- Sandy Material (Alex Sy, 1997): Friction is estimated based on Alex Sy, 1997 proposed equation $R_s = 9.7 * Z$ where Z is depth in metres and R_s is friction is in kPa.
- Gravelly Material (Alex Sy, 1997): Friction is estimated based on Alex Sy, 1997 proposed equation $R_s = Z + 25 * \sqrt{Z}$ where Z is depth in metres and R_s is friction is in kPa.


BPT Data

Enter Becker penetration test data in the table. This comprise depth, BPT blow counts and pressure readings. If friction is measured at specific depths, enter the friction in corresponding cells and leave the rest of cells in friction column empty. NovoBPT will automatically interpolate frictions in other depths. Then at each depth, net friction is calculated as below:

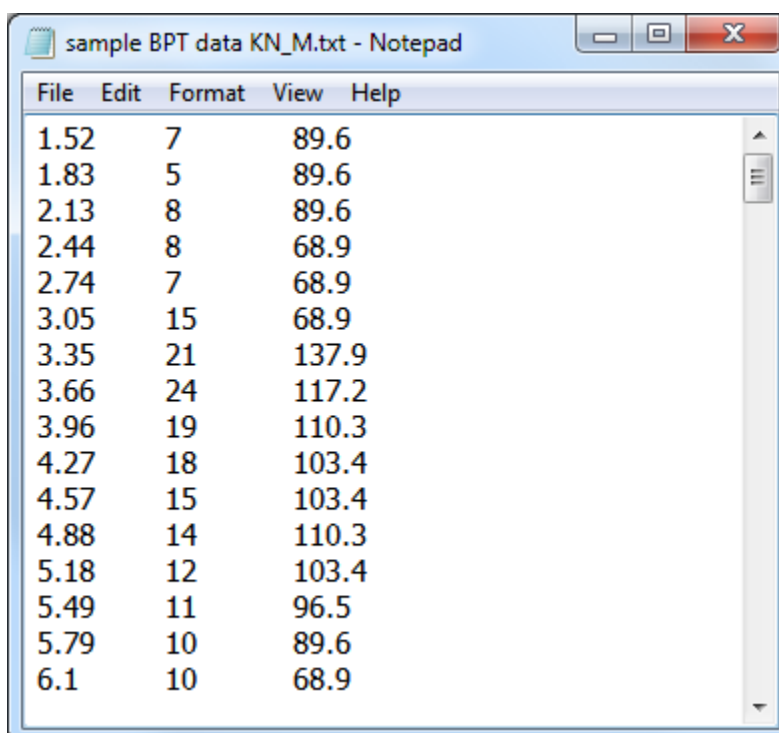
'Net Friction' = 'Measured Friction - ('Weight of Bit' + 'Weight of Scale Coupler' + 'Weight of Casing Per Unit Length' * Z)

As user enters each row of data, raw and corrected data are shown on the [charts](#)(See 4.6).

4.5.3 Importing Data FromText File

In case there are large number of Becker penetration test records, user may import data from Text files (*.txt) using  button above the table. The Text file should have the following format:

one record per line and three numbers on each line separated by space, comma or tab. For instance, if your BPT data is stored in a Text file, it looks like the following:



File	Edit	Format	View	Help
1.52	7	89.6		
1.83	5	89.6		
2.13	8	89.6		
2.44	8	68.9		
2.74	7	68.9		
3.05	15	68.9		
3.35	21	137.9		
3.66	24	117.2		
3.96	19	110.3		
4.27	18	103.4		
4.57	15	103.4		
4.88	14	110.3		
5.18	12	103.4		
5.49	11	96.5		
5.79	10	89.6		
6.1	10	68.9		

The first column carries depth (m / ft), second column carries BPT and third column being bounce chamber pressure reading (kPa / psf). Text files can be easily generated and edited by Windows **Notepad** or by exporting your data from spreadsheet applications such as Microsoft Excel into text format. Two sample text files are stored in NovoBPT installation folder (*sample BPT data KN_M.txt* and *sample BPT data LB_FT.txt*).

Note: Importing from file is mostly used when you have many rows of data; if your geotechnical model is simple, just enter them in the tables manually.

4.5.4 Project Information

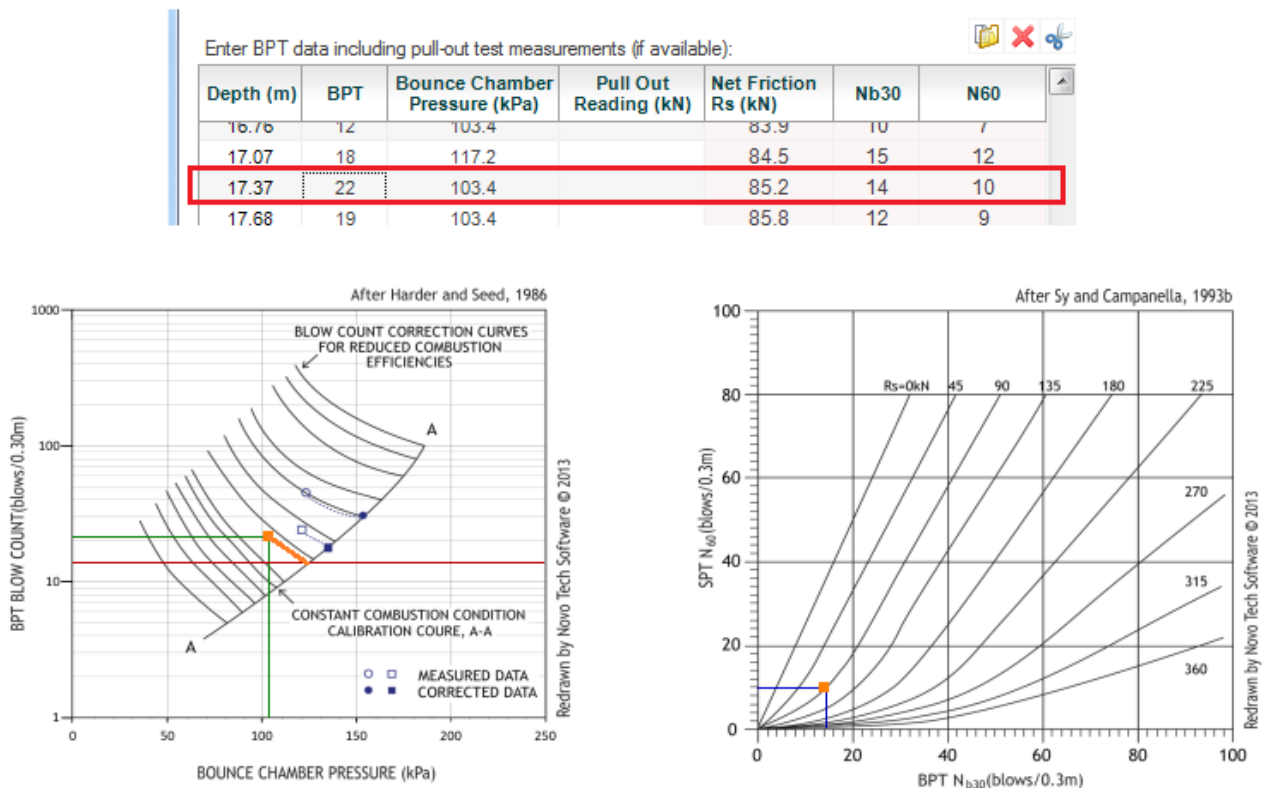
In order to edit project information, choose **Edit** ► **Project Info.** menu.

4.5.5 Company Information

In order to edit company information, choose **Edit** ► **Company Info.** menu. This includes choosing company name, logo, etc which will be shown in the reports.

4.6 Correction & Correlation Charts

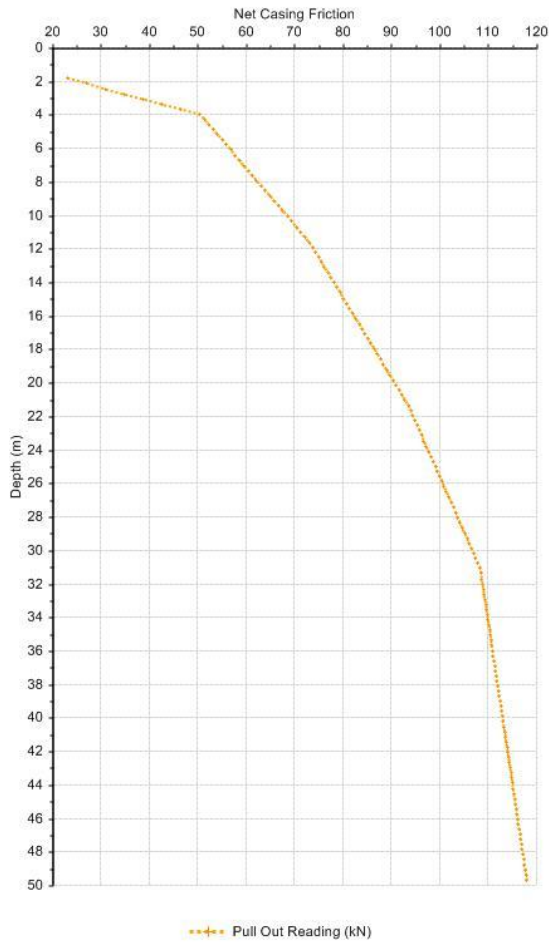
As user enters BPT data or clicks on a row of the table, data is shown on the pressure correction and N_{60} correlation charts. The following illustrates the charts:



At a depth of 17.37 m, BPT=22 and bounce chamber pressure $P = 103.4$ kPa. This point (BPT, P) is shown on the left chart by an orange square and two green lines. An orange line parallel to the closest contour shows the intersection with line A-A. The horizontal red line is drawn from this point to find the corrected BPT on vertical axis.

This corrected BPT is then used along with the net friction on the right chart to correlate BPT to N_{60} .

4.7 Effect of Casing Friction



If friction is measured at specific depths, enter the friction in corresponding cells of the table and leave the rest of cells in friction column empty. NovoBPT will automatically interpolate frictions in other depths. Then at each depth, net friction is calculated as below:

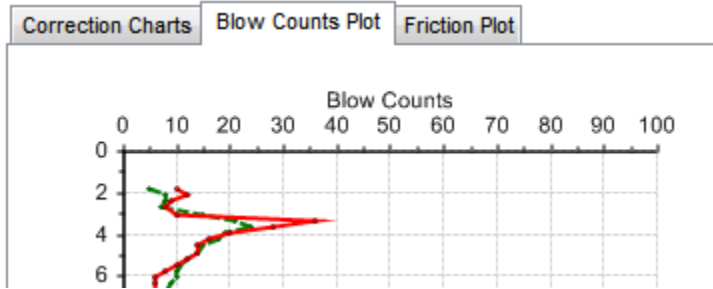
$$\text{'Net Friction'} = \text{'Measured Friction'} - (\text{'Weight of Bit'} + \text{'Weight of Scale Coupler'} + \text{'Weight of Casing Per Unit Length'} * Z)$$

To view the plot of net casing friction versus depth, click on the 'Friction Plot' tab at the right side of the page.

4.8 Outputs

4.8.1 Analysis Results

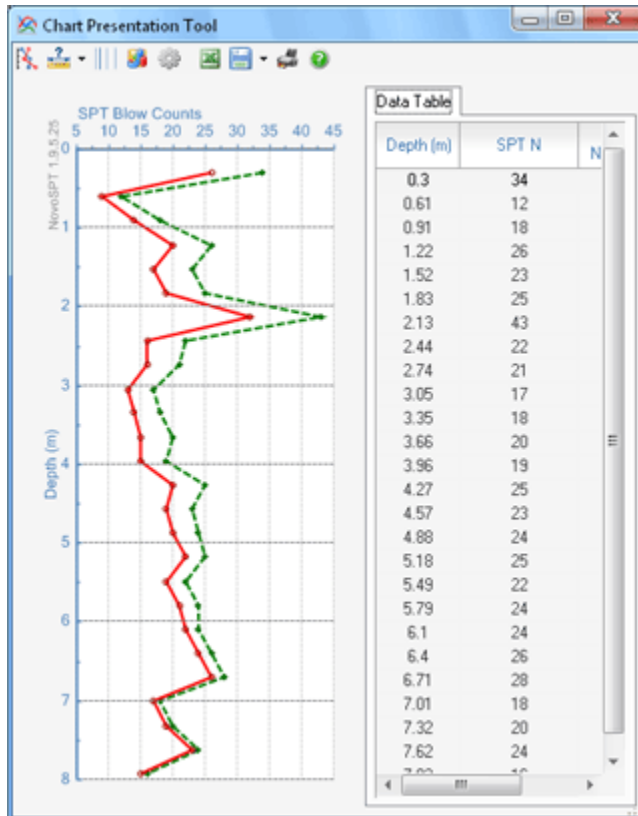
NovoBPT automatically carries out the BPT corrections and correlations as you enter data. The main results which are correlated SPT blow counts (N60) are shown on the 'Blow Count Plots' tab.



If any of the input data related to weight of bit, etc is updated please click on Apply link to recalculate the results.

4.8.2 Working with Graphs

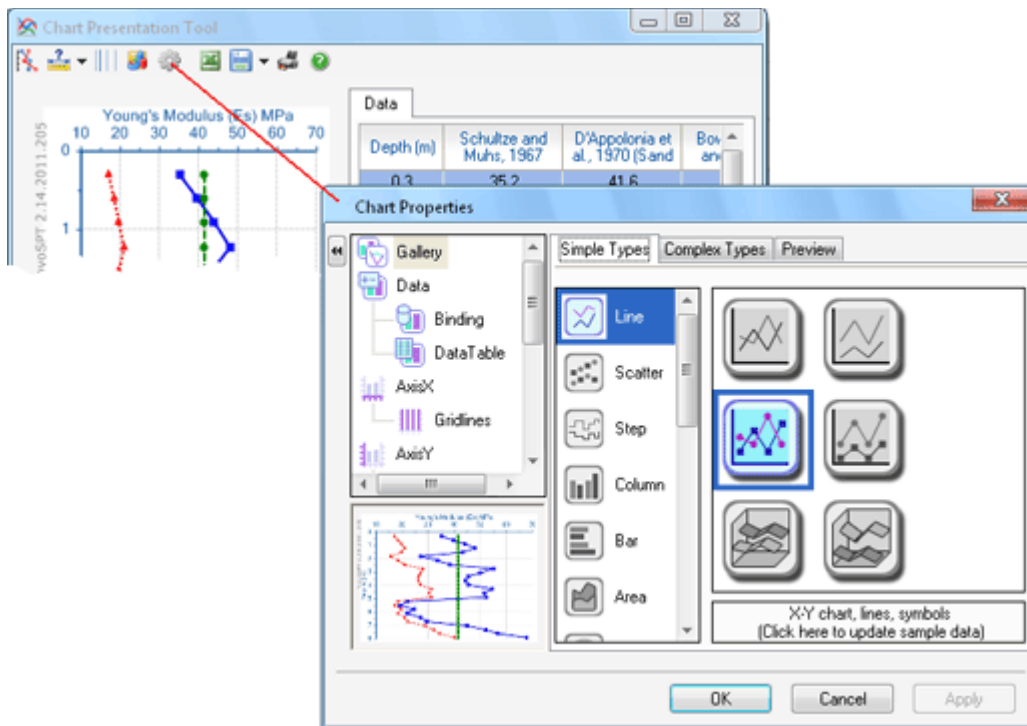
We understand that presentation of the analysis results is very important to our users. Everywhere in Novo Tech Software programs when you click on a chart, a new dialog appears containing the chart and its associated data. In the following example, the corresponding dataset is shown on right and can be scrolled horizontally and vertically to view all data. In addition, toolbar buttons provide you with more features:



- To change line styles of the plot
- To change the scale (minimum, maximum and gridlines) of each axis. Please click on small arrow on right side of the icon to open the dropdown menu
- To toggle between normal/logarithmic scale for horizontal axis
- To change the chart type
- To open the advanced settings page for the chart
- To save the dataset table as Microsoft Excel file
- To save the chart as text and graphic format
- To print the chart
- Opens this help page

How can I change the appearance of the chart such as legend, chart type, etc?


You can configure almost everything in the chart by clicking on button from the toolbar. This will open the following dialog box:

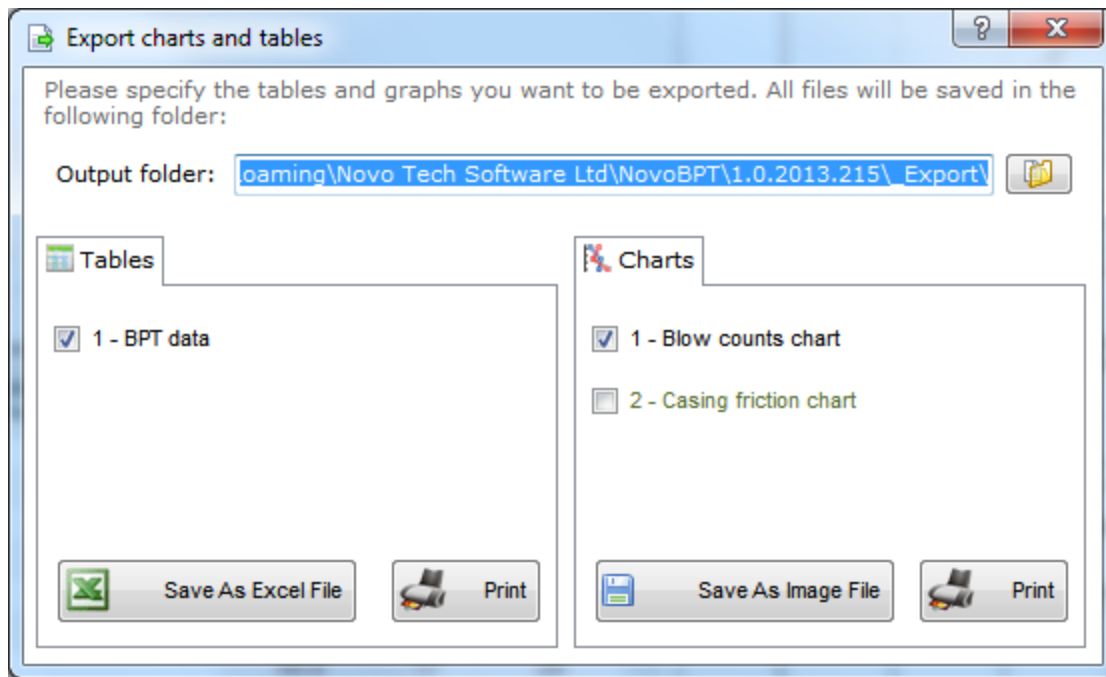


Click on the desired element from the list located on the left side of the page; more options will be shown on the right portion. Click on OK button to apply your changes.

4.8.3 Exporting the Results

Most of the users have already setup their spreadsheets and would rather keep their reports in the same format. To do this, they need to export the analysis results into other popular formats such as Microsoft Excel.

To export the results click on  button on the top toolbar. A dialog similar to the following screenshot will appear. List of all tables and charts of the analysis results will be shown (see below):



Please specify the output folder (You can change this folder by clicking on folder icon to the right of the path). Then select the items you want to export.

Exporting Data Tables

Tables can be saved as Microsoft Excel or may be directly sent to the printer.

Exporting Graphs (Charts)

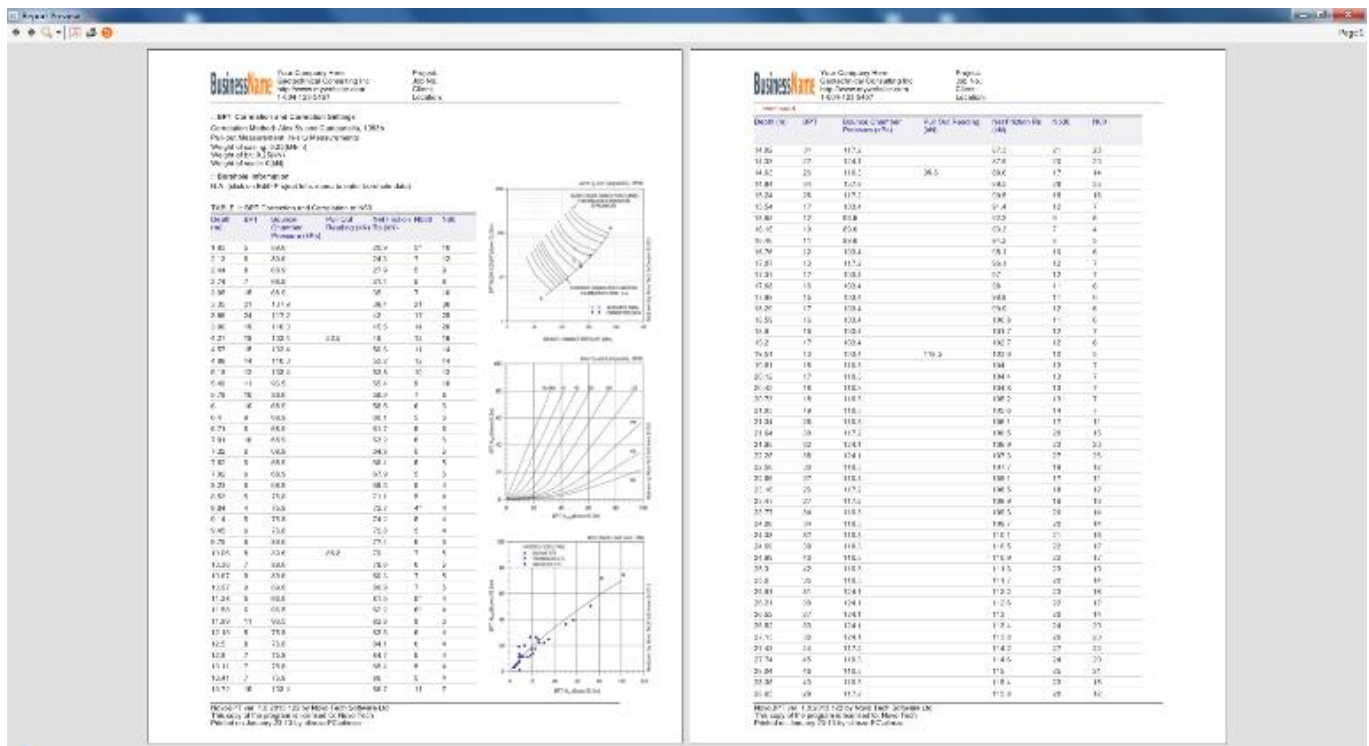
All charts may be saved with image formats such as BMP, PNG, JPG, etc or be printed.

4.8.4 Reporting

After performing the calculations if a report is needed, you can use of the following two options:

1. Exporting the table to Microsoft Excel file and graphs to image file. See how you can do this by reading [this article](#) (See 4.8.2).
2. Use **File** ► **Report Preview** menu to generate the report. This report includes input data and correlated N60 values plus graphs.

Please note that company information will be shown on the reports and can be edited from **Edit** ► **Company Info.** menu.



On report preview page, you can directly print the report or save it as PDF file.

4.9 Saving Project

In order to save your project data, choose **File ► Save** menu or click on the disk icon from the top toolbar. If this is the first time you save this project, you will need to specify the location on your hard drive or network where the file is to be saved.

4.10 Opening Projects

In order to load a previously saved project, choose **File ► Open** menu or click on the folder icon from the top toolbar.

You can also access to the most recent files loaded in NovoBPT by using **File ► Open recent files ...** menu.

4.11 Options

The following options are currently available:

Decimal Digits: Specifies number of decimals shown when calculating net friction.

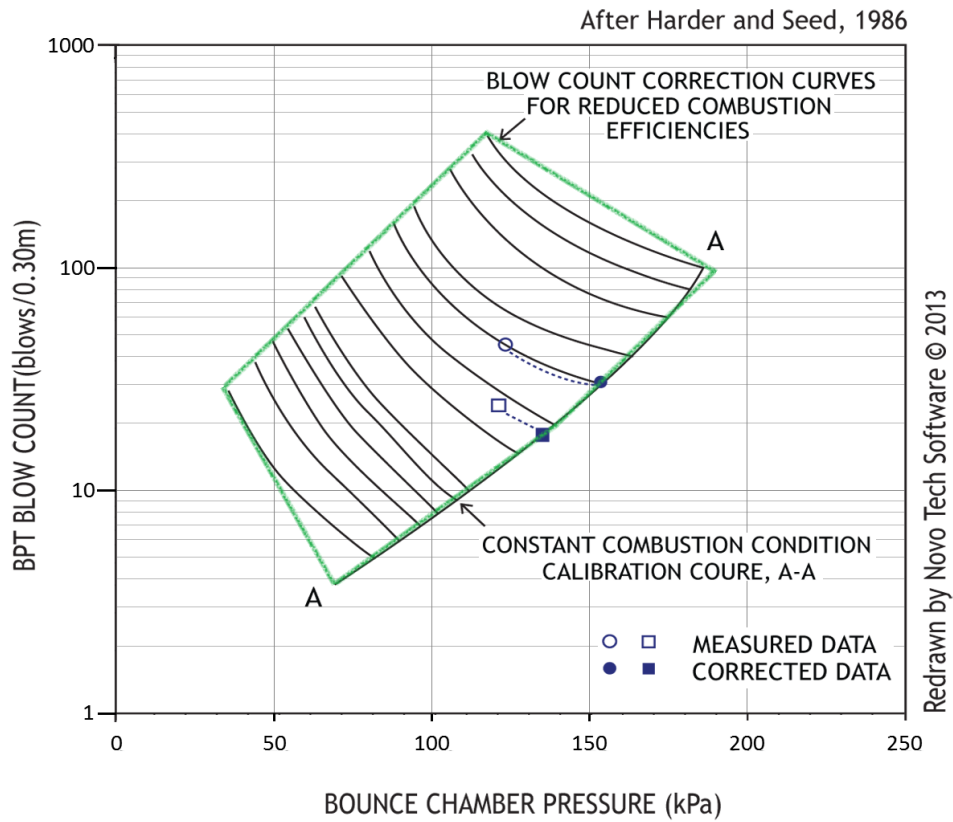
Units System: Select units system used in NovoSPT for data entry and output results. Round corrected BPT and correlated N60: If selected, all corrected and correlated N60 values are rounded to nearest integer value, otherwise one decimal is used.

4.12 Sources of Invalid Results

Some limitations apply to the use of bounce chamber pressure correction chart in NovoSPT. For example:

- If the point representing the field BPT and pressure falls under line A-A (constant combustion line), NovoBPT will not correct the field BPT and will return same field BPT number with an asterik sign beside it in the table (e.g. 5*).
- If the point is located outside the contours on the chart, no correction is applied on the field BPT and NovoBPT will return same number with # sign (e.g. 5#).

points outside the green ploygon shown below is where no pressure correction is done by NovoBPT.



5. Online

5.1 Novo Tech Software website

<http://www.novotechsoftware.com>

5.2 Our other programs

<http://www.novotechsoftware.com/products>

5.3 Updates

<http://www.novotechsoftware.com/updatelogs/NovoBPT.txt>

5.4 Contact us

<http://www.novolab2.com/web forms/contact.php>